



Seq Listing 2-7-07.txt

<110> APPLICANT: National Renewable Energy Laboratory
 <120> TITLE OF INVENTION: Cellobiohydrolase I Gene and Improved Variants
 <130> FILE REFERENCE: NREL 99-45
 <140> CURRENT APPLICATION NUMBER: US/10/031,496D
 <141> CURRENT FILING DATE: 2002-01-14
 <160> NUMBER OF SEQ ID NOS: 96
 <170> SOFTWARE: PatentIn version 3.3

<210> SEQ ID NO 1
 <211> LENGTH: 28
 <212> TYPE: DNA
 <213> ORGANISM: Artificial
 <220> FEATURE:
 <223> OTHER INFORMATION: Primer for PCR
 <400> SEQUENCE: 1
 agagagtcta gacacggagc ttacaggc

28

<210> SEQ ID NO 2
 <211> LENGTH: 35
 <212> TYPE: DNA
 <213> ORGANISM: Artificial
 <220> FEATURE:
 <223> OTHER INFORMATION: Primer for PCR
 <400> SEQUENCE: 2
 aaagaagcgc ggccgcgcct gcactctcca atcgg

35

<210> SEQ ID NO 3
 <211> LENGTH: 24
 <212> TYPE: DNA
 <213> ORGANISM: Artificial
 <220> FEATURE:
 <223> OTHER INFORMATION: Primer for PCR
 <400> SEQUENCE: 3
 ggcggaaacc cgcctggcac cacc

24

<210> SEQ ID NO 4
 <211> LENGTH: 1551
 <212> TYPE: DNA
 <213> ORGANISM: Trichoderma reesei
 <220> FEATURE:
 <221> NAME/KEY: CDS
 <222> LOCATION: (1)..(1545)
 <220> FEATURE:
 <221> NAME/KEY: misc_feature
 <222> LOCATION: (1)..(51)
 <220> FEATURE:
 <221> NAME/KEY: misc_feature
 <222> LOCATION: (52)..(1344)
 <220> FEATURE:
 <221> NAME/KEY: misc_binding
 <222> LOCATION: (1436)..(1550)
 <400> SEQUENCE: 4
 atg tat cgg aag ttg gcc gtc atc tcg gcc ttc ttg gcc aca gct cgt
 Met Tyr Arg Lys Leu Ala Val Ile Ser Ala Phe Leu Ala Thr Ala Arg
 1 5 10 15
 gct cag tcg gcc tgc act ctc caa tcg gag act cac ccg cct ctg aca
 Ala Gln Ser Ala Cys Thr Leu Gln Ser Glu Thr His Pro Pro Leu Thr
 20 25 30
 tgg cag aaa tgc tcg tct ggt ggc acg tgc act caa cag aca ggc tcc
 Trp Gln Lys Cys Ser Ser Gly Gly Thr Cys Thr Gln Gln Thr Gly Ser
 35 40 45
 gtg gtc atc gac gcc aac tgg cgc tgg act cac gct acg aac agc agc
 Val Val Ile Asp Ala Asn Trp Arg Trp Thr His Ala Thr Asn Ser Ser

48

96

144

192

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50	55	60	
acg aac tgc tac gat ggc aac act tgg agc tcg acc cta tgt cct gac			240
Thr Asn Cys Tyr Asp Gly Asn Thr Trp Ser Ser Thr Leu Cys Pro Asp			
65	70	75	80
aac gag acc tgc gcg aag aac tgc tgt ctg gac ggt gcc gcc tac gcg			288
Asn Glu Thr Cys Ala Lys Asn Cys Cys Leu Asp Gly Ala Ala Tyr Ala			
85	90	95	
tcc acg tac gga gtt acc acg agc ggt aac agc ctc tcc att ggc ttt			336
Ser Thr Tyr Gly Val Thr Thr Ser Gly Asn Ser Leu Ser Ile Gly Phe			
100	105	110	
gtc acc cag tct gcg cag aag aac gtt ggc gct cgc ctt tac ctt atg			384
Val Thr Gln Ser Ala Gln Lys Asn Val Gly Ala Arg Leu Tyr Leu Met			
115	120	125	
gca agc gac acg acc tac cag gaa ttc acc ctg ctt ggc aac gag ttc			432
Ala Ser Asp Thr Thr Tyr Gln Glu Phe Thr Leu Leu Gly Asn Glu Phe			
130	135	140	
tct ttc gat gtt gat gtt tcg cag ctg ccg tgc ggc ttg aac gga gct			480
Ser Phe Asp Val Asp Val Ser Gln Leu Pro Cys Gly Leu Asn Gly Ala			
145	150	155	160
ctc tac ttc gtg tcc atg gac gcg gat ggt ggc gtg agc aag tat ccc			528
Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Val Ser Lys Tyr Pro			
165	170	175	
acc aac acc gct ggc gcc aag tac ggc acg ggg tac tgt gac agc cag			576
Thr Asn Thr Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ser Gln			
180	185	190	
tgt ccc cgc gat ctg aag ttc atc aat ggc cag gcc aac gtt gag ggc			624
Cys Pro Arg Asp Leu Lys Phe Ile Asn Gly Gln Ala Asn Val Glu Gly			
195	200	205	
tgg gag ccg tca tcc aac aac gcg aac acg ggc att gga gga cac gga			672
Trp Glu Pro Ser Ser Asn Asn Ala Asn Thr Gly Ile Gly Gly His Gly			
210	215	220	
agc tgc tgc tct gag atg gat atc tgg gag ggc aac tcc atc tcc gag			720
Ser Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Ser Ile Ser Glu			
225	230	235	240
gct ctt acc ccc cac cct tgc acg act gtc ggc cag gag atc tgc gag			768
Ala Leu Thr Pro His Pro Cys Thr Thr Val Gly Gln Glu Ile Cys Glu			
245	250	255	
ggt gat ggg tgc ggc gga act tac tcc gat aac aga tat ggc ggc act			816
Gly Asp Gly Cys Gly Gly Thr Tyr Ser Asp Asn Arg Tyr Gly Gly Thr			
260	265	270	
tgc gat ccc gat ggc tgc gac tgg aac cca tac cgc ctg ggc aac acc			864
Cys Asp Pro Asp Gly Cys Asp Trp Asn Pro Tyr Arg Leu Gly Asn Thr			
275	280	285	
agc ttc tac ggc cct ggc tca agc ttt acc ctc gat acc acc aag aaa			912
Ser Phe Tyr Gly Pro Gly Ser Ser Phe Thr Leu Asp Thr Thr Lys Lys			
290	295	300	
ttg acc gtt gtc acc cag ttc gag acg tcg ggt gcc atc aac cga tac			960
Leu Thr Val Val Thr Gln Phe Glu Thr Ser Gly Ala Ile Asn Arg Tyr			
305	310	315	320
tat gtc cag aat ggc gtc act ttc cag cag ccc aac gcc gag ctt ggt			1008
Tyr Val Gln Asn Gly Val Thr Phe Gln Gln Pro Asn Ala Glu Leu Gly			
325	330	335	
agt tac tct ggc aac gag ctc aac gat gat tac tgc aca gct gag gag			1056
Ser Tyr Ser Gly Asn Glu Leu Asn Asp Asp Tyr Cys Thr Ala Glu Glu			
340	345	350	
gca gaa ttc ggc gga tcc tct ttc tca gac aag ggc ggc ctg act cag			1104
Ala Glu Phe Gly Gly Ser Ser Phe Ser Asp Lys Gly Gly Leu Thr Gln			
355	360	365	
ttc aag aag gct acc tct ggc ggc atg gtt ctg gtc atg agt ctg tgg			1152
Phe Lys Lys Ala Thr Ser Gly Gly Met Val Leu Val Met Ser Leu Trp			
370	375	380	
gat gat tac tac gcc aac atg ctg tgg ctg gac tcc acc tac ccg aca			1200
Asp Asp Tyr Tyr Ala Asn Met Leu Trp Leu Asp Ser Thr Tyr Pro Thr			

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385	390	395	400	
aac gag acc tcc tcc aca ccc ggt gcc gtc cgc gga agc tgc tcc acc				1248
Asn Glu Thr Ser Ser Thr Pro Gly Ala Val Arg Gly Ser Cys Ser Thr				
405	410	415		
agc tcc ggt gtc cct gct cag gtc gaa tct cag tct ccc aac gcc aag				1296
Ser Ser Gly Val Pro Ala Gln Val Glu Ser Gln Ser Pro Asn Ala Lys				
420	425	430		
gtc acc ttc tcc aac atc aag ttc gga ccc att ggc agc acc ggc aac				1344
Val Thr Phe Ser Asn Ile Lys Phe Gly Pro Ile Gly Ser Thr Gly Asn				
435	440	445		
cct agc ggc ggc aac cct ccc ggc gga aac ccg cct ggc acc acc acc				1392
Pro Ser Gly Gly Asn Pro Pro Gly Gly Asn Pro Pro Gly Thr Thr Thr				
450	455	460		
acc cgc cgc cca gcc act acc act gga agc tct ccc gga cct acc cag				1440
Thr Arg Arg Pro Ala Thr Thr Gly Ser Ser Pro Gly Pro Thr Gln				
465	470	475	480	
tct cac tac ggc cag tgc ggc ggt att ggc tac agc ggc ccc acg gtc				1488
Ser His Tyr Gly Gln Cys Gly Gly Ile Gly Tyr Ser Gly Pro Thr Val				
485	490	495		
tgc gcc agc ggc aca act tgc cag gtc ctg aac cct tac tac tct cag				1536
Cys Ala Ser Gly Thr Thr Cys Gln Val Leu Asn Pro Tyr Tyr Ser Gln				
500	505	510		
tgc ctg taa agctcc				1551
Cys Leu				

<210> SEQ ID NO 5

<211> LENGTH: 514

<212> TYPE: PRT

<213> ORGANISM: Trichoderma reesei

<400> SEQUENCE: 5

Met Tyr Arg Lys Leu Ala Val Ile Ser Ala Phe Leu Ala Thr Ala Arg			
1	5	10	15
Ala Gln Ser Ala Cys Thr Leu Gln Ser Glu Thr His Pro Pro Leu Thr			
20	25	30	
Trp Gln Lys Cys Ser Ser Gly Gly Thr Cys Thr Gln Gln Thr Gly Ser			
35	40	45	
Val Val Ile Asp Ala Asn Trp Arg Trp Thr His Ala Thr Asn Ser Ser			
50	55	60	
Thr Asn Cys Tyr Asp Gly Asn Thr Trp Ser Ser Thr Leu Cys Pro Asp			
65	70	75	80
Asn Glu Thr Cys Ala Lys Asn Cys Cys Leu Asp Gly Ala Ala Tyr Ala			
85	90	95	
Ser Thr Tyr Gly Val Thr Ser Gly Asn Ser Leu Ser Ile Gly Phe			
100	105	110	
Val Thr Gln Ser Ala Gln Lys Asn Val Gly Ala Arg Leu Tyr Leu Met			
115	120	125	
Ala Ser Asp Thr Thr Tyr Gln Glu Phe Thr Leu Leu Gly Asn Glu Phe			
130	135	140	
Ser Phe Asp Val Asp Val Ser Gln Leu Pro Cys Gly Leu Asn Gly Ala			
145	150	155	160
Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Val Ser Lys Tyr Pro			
165	170	175	
Thr Asn Thr Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ser Gln			
180	185	190	
Cys Pro Arg Asp Leu Lys Phe Ile Asn Gly Gln Ala Asn Val Glu Gly			
195	200	205	
Trp Glu Pro Ser Ser Asn Asn Ala Asn Thr Gly Ile Gly Gly His Gly			
210	215	220	
Ser Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Ser Ile Ser Glu			
225	230	235	240
Ala Leu Thr Pro His Pro Cys Thr Thr Val Gly Gln Glu Ile Cys Glu			
245	250	255	
Gly Asp Gly Cys Gly Gly Thr Tyr Ser Asp Asn Arg Tyr Gly Thr			

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260	265	270	
Cys Asp Pro Asp Gly Cys Asp Trp Asn Pro Tyr Arg	Leu Gly Asn Thr		
275	280	285	
Ser Phe Tyr Gly Pro Gly Ser Ser Phe Thr Leu Asp	Thr Thr Lys Lys		
290	295	300	
Leu Thr Val Val Thr Gln Phe Glu Thr Ser Gly Ala	Ile Asn Arg Tyr		
305	310	315	320
Tyr Val Gln Asn Gly Val Thr Phe Gln Gln Pro Asn	Ala Glu Leu Gly		
325	330	335	
Ser Tyr Ser Gly Asn Glu Leu Asn Asp Asp Tyr Cys	Thr Ala Glu Glu		
340	345	350	
Ala Glu Phe Gly Gly Ser Ser Phe Ser Asp Lys Gly	Gly Leu Thr Gln		
355	360	365	
Phe Lys Lys Ala Thr Ser Gly Gly Met Val Leu Val	Met Ser Leu Trp		
370	375	380	
Asp Asp Tyr Tyr Ala Asn Met Leu Trp Leu Asp Ser	Thr Tyr Pro Thr		
385	390	395	400
Asn Glu Thr Ser Ser Thr Pro Gly Ala Val Arg Gly	Ser Cys Ser Thr		
405	410	415	
Ser Ser Gly Val Pro Ala Gln Val Glu Ser Gln Ser	Pro Asn Ala Lys		
420	425	430	
Val Thr Phe Ser Asn Ile Lys Phe Gly Pro Ile Gly	Ser Thr Gly Asn		
435	440	445	
Pro Ser Gly Gly Asn Pro Pro Gly Gly Asn Pro Pro	Gly Thr Thr Thr		
450	455	460	
Thr Arg Arg Pro Ala Thr Thr Thr Gly Ser Ser Pro	Gly Pro Thr Gln		
465	470	475	480
Ser His Tyr Gly Gln Cys Gly Gly Ile Gly Tyr Ser	Gly Pro Thr Val		
485	490	495	
Cys Ala Ser Gly Thr Thr Cys Gln Val Leu Asn Pro	Tyr Ser Gln		
500	505	510	
Cys Leu			

<210> SEQ ID NO 6		
<211> LENGTH: 45		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
<400> SEQUENCE: 6		
cctcccgccg gaaacccgccc tggcaccacc accacccgcc gcccc		45
<210> SEQ ID NO 7		
<211> LENGTH: 32		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
<400> SEQUENCE: 7		
ggactcacgc tacggccagc agcacgaact gc		32
<210> SEQ ID NO 8		
<211> LENGTH: 36		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
<400> SEQUENCE: 8		
cccataccgc ctgggcgcca ccagttcta cggccc		36
<210> SEQ ID NO 9		
<211> LENGTH: 41		
<212> TYPE: DNA		

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<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 9
ggactccacc taccggacag ccgagacctc ctccacaccc g 41

<210> SEQ ID NO 10
<211> LENGTH: 26
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 10
gcactctcca atcggagact cacccg 26

<210> SEQ ID NO 11
<211> LENGTH: 26
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 11
gcactctcca accggagact cacccg 26

<210> SEQ ID NO 12
<211> LENGTH: 26
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Synthetic
<400> SEQUENCE: 12
cgggtgagtc tccgggttgg a gagtgc 26

<210> SEQ ID NO 13
<211> LENGTH: 28
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 13
ggcacgtgca ctcaacagac aggctccg 28

<210> SEQ ID NO 14
<211> LENGTH: 28
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 14
ggcacgtgca ctccacagac aggctccg 28

<210> SEQ ID NO 15
<211> LENGTH: 28
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 15
cgagacctgt ctgtggagtg cacgtgcc 28

<210> SEQ ID NO 16
<211> LENGTH: 32
<212> TYPE: DNA

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<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 16
ggcgctggac tcacgctacg aacagcagca cg 32

<210> SEQ ID NO 17
<211> LENGTH: 32
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 17
cgtgctgctg ttcgttagggt gagtccagcg cc 32

<210> SEQ ID NO 18
<211> LENGTH: 26
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 18
gctgtctgga cggtgccgccc tacgcg 26

<210> SEQ ID NO 19
<211> LENGTH: 32
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 19
cgtgctgctg ttcgttagggt gagtccagcg cc 32

<210> SEQ ID NO 20
<211> LENGTH: 26
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 20
gctgtctgga ccctgccc tacgcg 26

<210> SEQ ID NO 21
<211> LENGTH: 26
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 21
cgcgttaggctgc gcagggtcca gacagc 26

<210> SEQ ID NO 22
<211> LENGTH: 24
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 22
gcctctccat tggctttgtc accc 24

<210> SEQ ID NO 23
<211> LENGTH: 24
<212> TYPE: DNA

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<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 23
gcctctccat tccctttgtc accc 24

<210> SEQ ID NO 24
<211> LENGTH: 24
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 24
gggtgacaaa gggaatggag aggc 24

<210> SEQ ID NO 25
<211> LENGTH: 24
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 25
ggccaacgtt gagggctggg agcc 24

<210> SEQ ID NO 26
<211> LENGTH: 24
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 26
ggccaacgtt ccgggctggg agcc 24

<210> SEQ ID NO 27
<211> LENGTH: 24
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 27
ggctcccaagc ccggAACgtt ggcc 24

<210> SEQ ID NO 28
<211> LENGTH: 27
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 28
ggctgggagc cgtcatccaa caacgcg 27

<210> SEQ ID NO 29
<211> LENGTH: 27
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 29
ggctgggagc cgccatccaa caacgcg 27

<210> SEQ ID NO 30
<211> LENGTH: 27
<212> TYPE: DNA

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<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 30
cgcgttggatggcggct cccagcc 27

<210> SEQ ID NO 31
<211> LENGTH: 32
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 31
cgataccacc aagaaattga ccgttgcac cc 32

<210> SEQ ID NO 32
<211> LENGTH: 32
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 32
cgataccacc aagccattga ccgttgcac cc 32

<210> SEQ ID NO 33
<211> LENGTH: 32
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 33
gggtgacaac ggtcaatggc ttgggttat cg 32

<210> SEQ ID NO 34
<211> LENGTH: 28
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 34
cgagacgtcg ggtccatca accgatac 28

<210> SEQ ID NO 35
<211> LENGTH: 28
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 35
cgagacgtcg ggtccatca accgatac 28

<210> SEQ ID NO 36
<211> LENGTH: 28
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 36
gtatcggttg atgggaccccg acgtctcg 28

<210> SEQ ID NO 37
<211> LENGTH: 35
<212> TYPE: DNA

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<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
<400> SEQUENCE: 37		
ggcgtcaatt tccagcagcc caacggcgag cttgg		35
<210> SEQ ID NO 38		
<211> LENGTH: 35		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
<400> SEQUENCE: 38		
ggcgtcaatt tcccgagcc ccccgccgag cttgg		35
<210> SEQ ID NO 39		
<211> LENGTH: 35		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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ccaagtcgg cggggggctg cgggaaagtg acgcc		35
<210> SEQ ID NO 40		
<211> LENGTH: 26		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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ggctacctct ggcggcatgg ttctgg		26
<210> SEQ ID NO 41		
<211> LENGTH: 26		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
<400> SEQUENCE: 41		
ggctacctct cccggcatgg ttctgg		26
<210> SEQ ID NO 42		
<211> LENGTH: 26		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
<400> SEQUENCE: 42		
ccagaaccat gccggagag gtagcc		26
<210> SEQ ID NO 43		
<211> LENGTH: 34		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
<400> SEQUENCE: 43		
gcggaagctg ctccaccaggc tccgggtgtcc ctgc		34
<210> SEQ ID NO 44		
<211> LENGTH: 34		
<212> TYPE: DNA		

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<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 44
gccaaggctg cccaccaggc cccgggtgtcc ctgc 34

<210> SEQ ID NO 45
<211> LENGTH: 34
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 45
gcagggacac cggggcttgtt gggcagctt ccgc 34

<210> SEQ ID NO 46
<211> LENGTH: 22
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 46
gtctcccaac gccaagggtca cc 22

<210> SEQ ID NO 47
<211> LENGTH: 22
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 47
gtctcccaac cccaagggtca cc 22

<210> SEQ ID NO 48
<211> LENGTH: 22
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 48
ggtgaccccttg gggttgggag ac 22

<210> SEQ ID NO 49
<211> LENGTH: 32
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 49
ggcagcacccg gcaacccttag cggcggcaac cc 32

<210> SEQ ID NO 50
<211> LENGTH: 32
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 50
ggcagcacccg gccccccctcc cggcggcaac cc 32

<210> SEQ ID NO 51
<211> LENGTH: 32
<212> TYPE: DNA

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<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
<400> SEQUENCE: 51	
gggttgcgc cgggaggggg gccggtgctg cc	32
<210> SEQ ID NO 52	
<211> LENGTH: 36	
<212> TYPE: DNA	
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ggctttgtca cccagtctgc gcagaagaac gttggc	36
<210> SEQ ID NO 53	
<211> LENGTH: 36	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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ggctttgtca cccagggtgc gcagaagaac gttggc	36
<210> SEQ ID NO 54	
<211> LENGTH: 36	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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gccaacgttc ttctgcgcac cctgggtgac aaagcc	36
<210> SEQ ID NO 55	
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<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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ccgataacag atatggcggc	20
<210> SEQ ID NO 56	
<211> LENGTH: 20	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
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<223> OTHER INFORMATION: Primer for PCR	
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ccgataacgc ctatggcggc	20
<210> SEQ ID NO 57	
<211> LENGTH: 20	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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gccgccccatag gcgttatcgg	20
<210> SEQ ID NO 58	
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<212> TYPE: DNA	

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<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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cccggtgccg tgcgcggaag ctgctccacc		
<210> SEQ ID NO 59		
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<212> TYPE: DNA		
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cccggtgccg tggccggaag ctgctccacc		
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<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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ggtggagcag cttccggcca cggcaccggg		
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<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
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gctgaggagg cagaattcgg cgatcctct ttctc		
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<211> LENGTH: 35		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
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gctgaggagg cagaagccgg cgatcctct ttctc		
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<212> TYPE: DNA		
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<220> FEATURE:		
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gagaaagagg atccgcggc ttctgcctcc tcagc		
<210> SEQ ID NO 64		
<211> LENGTH: 29		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
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<223> OTHER INFORMATION: Primer for PCR		
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ggaaccata ccgcctgggc aacaccaggc		
<210> SEQ ID NO 65		
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<212> TYPE: DNA		

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<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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<210> SEQ ID NO 66		
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<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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gctgggtttg cccagggcgt atgggttcc		29
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<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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cctacccgac aaacgagacc tcctccacac ccgg		34
<210> SEQ ID NO 68		
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<212> TYPE: DNA		
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<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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cctacccgac aaacgccacc tcctccacac ccgg		34
<210> SEQ ID NO 69		
<211> LENGTH: 34		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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ccgggtgtgg aggaggtggc gtttgcggg tagg		34
<210> SEQ ID NO 70		
<211> LENGTH: 32		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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ggactcacgc tacggccagc agcacgaact gc		32
<210> SEQ ID NO 71		
<211> LENGTH: 32		
<212> TYPE: DNA		
<213> ORGANISM: Artificial		
<220> FEATURE:		
<223> OTHER INFORMATION: Primer for PCR		
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gcagttcgtg ctgctggccg tagcgtgagt cc		32
<210> SEQ ID NO 72		
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<212> TYPE: DNA		

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<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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<211> LENGTH: 36	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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cccataccgc ctgggcgcca ccagttcta cggccc	36
<210> SEQ ID NO 74	
<211> LENGTH: 36	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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ggccgtaga agctggtggc gcccaggcgg tatggg	36
<210> SEQ ID NO 75	
<211> LENGTH: 36	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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cccataccgc ctggcaaca ccagttcta cggccc	36
<210> SEQ ID NO 76	
<211> LENGTH: 41	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
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ggactccacc tacccgacag ccgagacctc ctccacaccc g	41
<210> SEQ ID NO 77	
<211> LENGTH: 41	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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cgggtgtgga ggaggtctcg gctgtcggtt aggtggagtc c	41
<210> SEQ ID NO 78	
<211> LENGTH: 41	
<212> TYPE: DNA	
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<223> OTHER INFORMATION: Primer for PCR	
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ggactccacc tacccgacaa acgagacctc ctccacaccc g	41
<210> SEQ ID NO 79	
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<212> TYPE: DNA	

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<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 79
gctgaggagg cagaattcgg cg 23

<210> SEQ ID NO 80
<211> LENGTH: 23
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 80
gctgaggagg cacgcttcgg cg 23

<210> SEQ ID NO 81
<211> LENGTH: 23
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 81
ccgccgaagc gtgcctcctc agc 23

<210> SEQ ID NO 82
<211> LENGTH: 27
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 82
ggcaacgagc tcaacgatga ttactgc 27

<210> SEQ ID NO 83
<211> LENGTH: 27
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 83
ggcaacgagc tcgacgatga ttactgc 27

<210> SEQ ID NO 84
<211> LENGTH: 27
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 84
cgagtaatca tcgtcgagct cgttgcc 27

<210> SEQ ID NO 85
<211> LENGTH: 35
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 85
ccggtgtccc tgctcaggtc gaatctcagt ctccc 35

<210> SEQ ID NO 86
<211> LENGTH: 35
<212> TYPE: DNA

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<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
<400> SEQUENCE: 86	
ccggtgtccc tgatcaggta gaatctcagt ctccc	35
<210> SEQ ID NO 87	
<211> LENGTH: 35	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
<400> SEQUENCE: 87	
gggagactga gattcgacct gatcagggac accgg	35
<210> SEQ ID NO 88	
<211> LENGTH: 30	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
<400> SEQUENCE: 88	
gctcaggatcg aatctcagtc tcccaacgccc	30
<210> SEQ ID NO 89	
<211> LENGTH: 30	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
<400> SEQUENCE: 89	
gctcaggatcg aatctcgctc tcccaacgccc	30
<210> SEQ ID NO 90	
<211> LENGTH: 30	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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ggcggtggga gagcgagatt cgacctgagc	30
<210> SEQ ID NO 91	
<211> LENGTH: 29	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
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ccctatgtcc tgacaaacgag acctgcgcg	29
<210> SEQ ID NO 92	
<211> LENGTH: 29	
<212> TYPE: DNA	
<213> ORGANISM: Artificial	
<220> FEATURE:	
<223> OTHER INFORMATION: Primer for PCR	
<400> SEQUENCE: 92	
ccctatgtcc tgacgacgag acctgcgcg	29
<210> SEQ ID NO 93	
<211> LENGTH: 29	
<212> TYPE: DNA	

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<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 93
cgcgcaggtc tcgtcgtag gacataggg 29

<210> SEQ ID NO 94
<211> LENGTH: 44
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 94
gctcgaccct atgtcctgac aacgagacct ggcgaa 44

<210> SEQ ID NO 95
<211> LENGTH: 44
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 95
gctcgaccct atgtcctgac gacgagacct ggcgaa 44

<210> SEQ ID NO 96
<211> LENGTH: 44
<212> TYPE: DNA
<213> ORGANISM: Artificial
<220> FEATURE:
<223> OTHER INFORMATION: Primer for PCR
<400> SEQUENCE: 96
gcagttttc ggcaggctc cgtcgtagg acatagggtc gagg 44